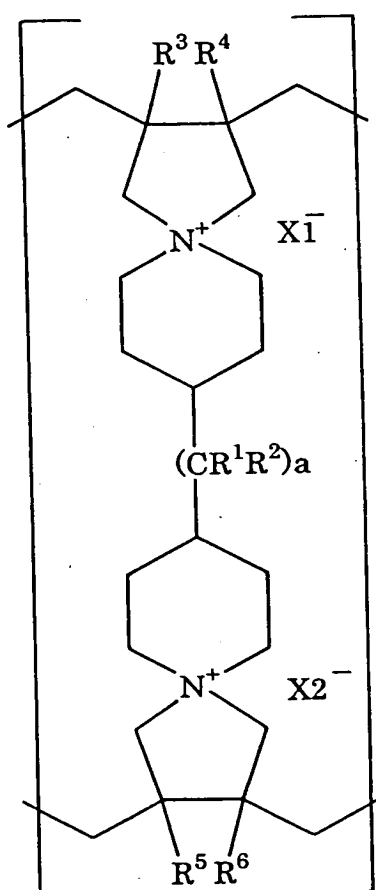


CLAIMS

1. A crosslinked polymer having at least one crosslink structure and a tertiary amine structure and/or a quaternary ammonium salt structure,

wherein at least one crosslink structure is represented by the following general formula (1):



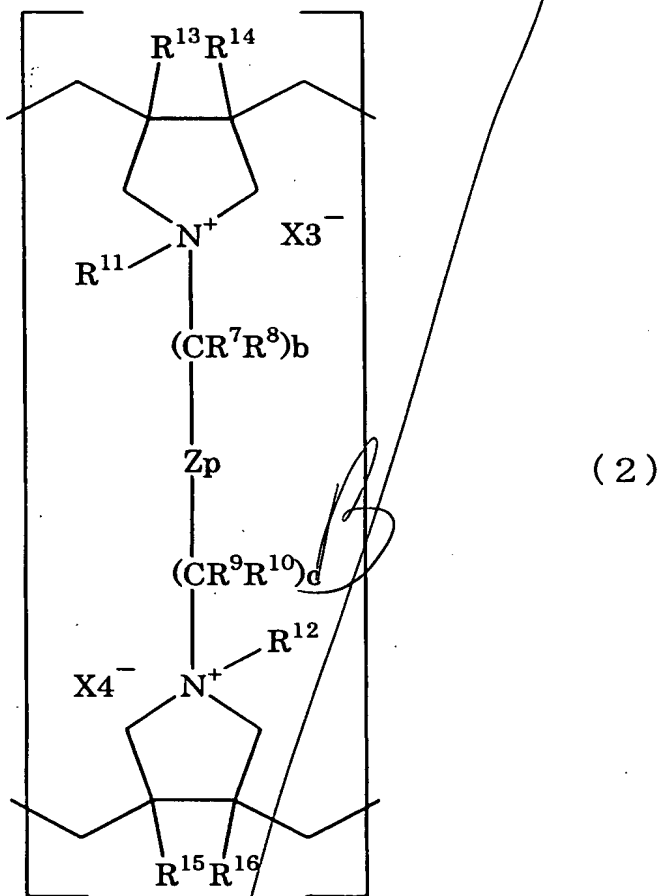
(1)

- 10 wherein R^1 and R^2 are the same or different and each represents a hydrogen or halogen atom or a C_{1-10} alkyl or hydroxyl group; R^3 , R^4 , R^5 and R^6 are the same or different and each represents a hydrogen or halogen atom or a methyl or ethyl group; $X1^-$ and $X2^-$ are the same or different and each represents a halide ion,

a hydroxide ion or an organic or inorganic acid anion and a represents an integer of 0 to 10.

2. A crosslinked polymer having at least one crosslink structure and a tertiary amine structure and/or a quaternary ammonium salt structure,

wherein at least one crosslink structure is represented by the following general formula (2):

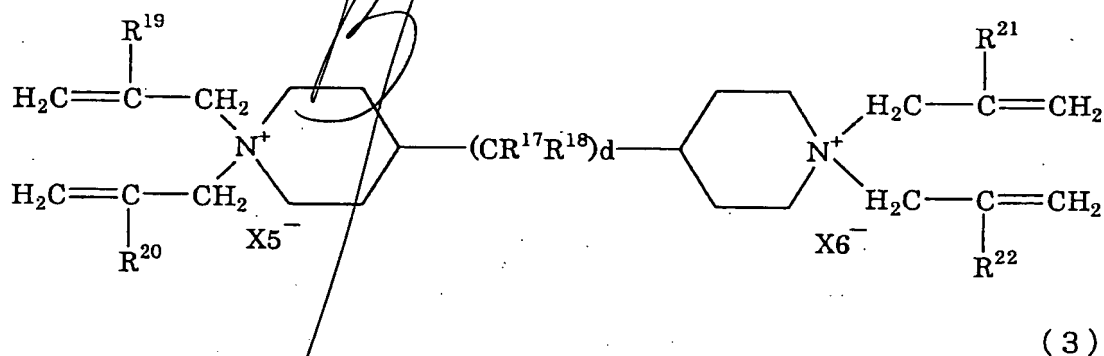


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wherein R^7 , R^8 , R^9 and R^{10} are the same or different and each represents a hydrogen or halogen atom or a C_{1-10} alkyl or hydroxyl group; R^{11} and R^{12} are the same or different and each represents

a C_{1-10} alkyl group; R^{13} , R^{14} , R^{15} and R^{16} are the same or different and each represents a hydrogen or halogen atom or a methyl or ethyl group; $X3^-$ and $X4^-$ are the same or different and each represents a halide ion, a hydroxide ion or an organic or inorganic acid anion, b and c are the same or different and each represents an integer of 0 to 10; and p represents 0 or 1 provided that the relation $b + c + p \geq 1$ should be satisfied; Z represents an $-NH-$, $-N(CH_3)-$, $-NH-(CH_2)_3-NH-$, $-NH-(CH_2)_4-NH-$, $-O-$, $-CH(OH)-$, $-O-CH_2-C(CH_3)_2-CH_2-O-$, $-O-(CH_2)_2-(O-CH_2-CH_2)_n-O-$, 1,4-piperazinylene, 3-methyl-2,6-pyridyl, 4-methyl-2,6-pyridyl, 2,6-pyridyl or 2,5-pyridyl group and n represents an integer of not less than 0.

3. A crosslinking agent having a structure represented by the following general formula (3):



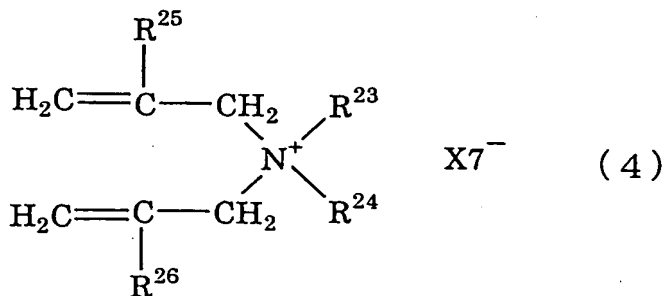
wherein R^{17} and R^{18} are the same or different and each represents a hydrogen or halogen atom or a C_{1-10} alkyl or hydroxyl group; R^{19} , R^{20} , R^{21} and R^{22} are the same or different and each represents a hydrogen or halogen atom or a methyl or ethyl group; $X5^-$ and $X6^-$ are the same or different and each represents a halide ion, a hydroxide ion or an organic or inorganic acid anion and d represents an integer of 0 to 10.

2. A method of producing the crosslinked polymer

according to Claim 1

which comprises the step of suspension polymerization of a monomer composition comprising a monomer represented by the following general formula (4):

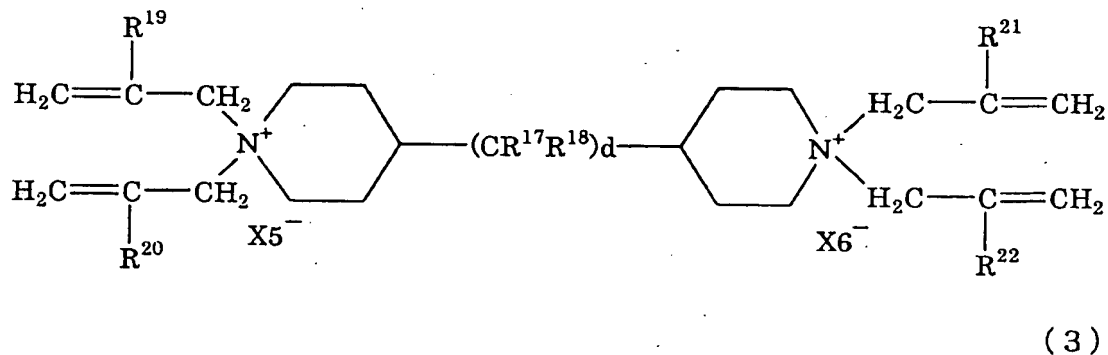
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wherein R^{23} and R^{24} are the same or different and each represents a C_{1-10} alkyl group; R^{25} and R^{26} are the same or different and each represents a hydrogen or halogen atom or a methyl or ethyl group; and X7^- represents a halide ion, a hydroxide ion or an organic or inorganic acid anion,

and a crosslinking agent represented by the following general formula (3):



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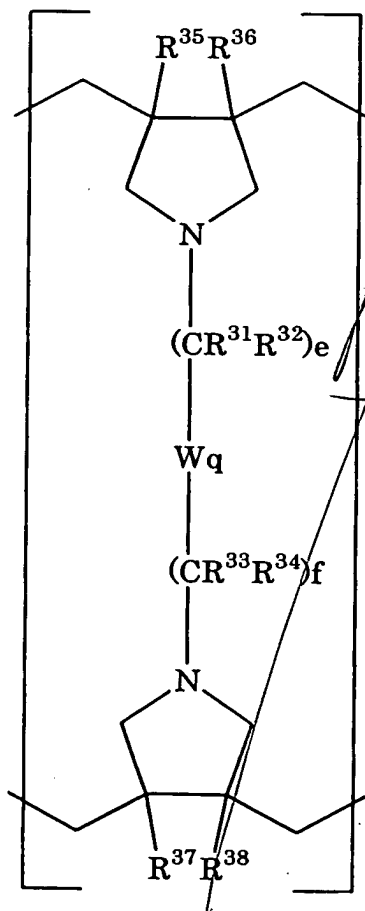
wherein R^{17} and R^{18} are the same or different and each represents a hydrogen or halogen atom or a C_{1-10} alkyl or hydroxyl group; R^{19} , R^{20} , R^{21} and R^{22} are the same or different and each represents

a hydrogen or halogen atom or a methyl or ethyl group; $X5^-$ and $X6^-$ are the same or different and each represents a halide ion, a hydroxide ion or an organic or inorganic acid anion; and d represents an integer of 0 to 10.

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5. A method of producing the crosslinked polymer according to Claim 2

which comprises the step of quaternizing a crosslinked polymer having at least one crosslink structure and a tertiary amine structure and/or a quaternary ammonium salt structure, at least one crosslink structure being represented by the general formula (5):



(5)

wherein R^{31} , R^{32} , R^{33} and R^{34} are the same or different and each represents a hydrogen or halogen atom or a C_{1-10} alkyl or hydroxyl group; R^{35} , R^{36} , R^{37} and R^{38} are the same or different and each represents a hydrogen or halogen atom or a methyl or ethyl group; e and f are the same or different and each represents an integer of 0 to 10; and q represents 0 or 1 provided that the relation $e + f + q \geq 1$ should be satisfied; W represents an $-NH-$, $-N(CH_3)-$, $-NH-(CH_2)_3-NH-$, $-NH-(CH_2)_4-NH-$, $-O-$, $-CH(OH)-$, $-O-CH_2-$, $C(CH_3)_2-CH_2-O-$, $-O-(CH_2)_2-(O-CH_2-CH_2)_m-O-$, 1,4-piperazinylene, 3-methyl-2,6-pyridyl, 4-methyl-2,6-pyridyl, 2,6-pyridyl or 2,5-pyridyl group and m represents an integer of not less than 0.

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A27 6. A method of producing a spherical particle in a medium wherein said medium comprises a viscous fluid.

4 7. The method of producing a spherical particle according to Claim 6, wherein said viscous fluid comprises a liquid paraffin and/or a silicone oil.

25 8. A method of using the crosslinked polymer according to Claim 1 or 2 in a reaction step wherein said reaction step is a step of carrying out an ion exchange reaction or a step of carrying out a reaction for activating an active hydrogen atom in an active hydrogen-containing compound.

30 9. A method of producing a hydroxy alkyl (meth)acrylate by the reaction of a (meth)acrylic acid with an oxirane compound,

35 wherein the crosslinked polymer according to Claim 1 or 2 is used as a catalyst.

10. A method of producing glycols by the reaction of water with an oxirane compound,

5 wherein the crosslinked polymer according to Claim 1 or 2 is used as a catalyst.

11. A method of producing glycols by the reaction of an oxirane compound with water in the presence of a crosslinked polymer

10 wherein said crosslinked polymer comprises an organic high-molecular compound having a hetero atom, as an essential member, in the main chain and/or crosslink structure,

15 said organic high-molecular compound not having a hydrogen directly bonded to a hetero atom.

12. The method of producing glycols according to Claim 11,

20 wherein said organic high-molecular compound has a repeating unit having, as the main constituent of the main chain thereof, a quaternary ammonium salt structure composed of a diallyldimethylammonium salt.

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